
A THREE-TON CAPACITY FLATBED PADDY DRYER FIRED WITH RICE HUSK GASIFIER COMBUSTOR

by

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Praise God!!

A three-ton-capacity flatbed dryer can now be fired with rice husk gasifier combustor in drying paddy suitable for use by medium-sized rice farmers. Instead of firing the dryer with the conventional step-grate rice husk furnace as what farmers have been using, the dryer can now be conveniently operated using the rice husk gasifier as source of heat that produces clean burning gaseous fuel from rice husks. This development is another revolutionary breakthrough by the Carbon Neutral Commons (CNC) in its incessant R&D effort aimed at developing clean, efficient and quality-char-producing gasification technology. With the rice husk gasifier technology, rice farmers can have an avenue to reduce the cost and dependency on the use of conventional fuel; while, at the same time, enjoying the benefits derived from using the rice husk gasifier that uses clean biomass fuel that entails them no cost since it is the by-product of their harvest. By using the rice husk gasifier, the farmer is making quite a contribution in carbon sequestration.

The gasifier (Fig. 1) is a rice husk gasifier combustor model- 40D designed to match up with the energy requirement of a 3ton-capacity flatbed dryer. This unit was built for Mr. Benjamin Dagdag of Brgy Ligao, Sta Maria, Ilocos Sur who owns a 5-hectare rice farm and has a 1ton-per-hour capacity or no. 8 rubber roll rice mill. Mr. Dagdag is a retired accountant from the United States who is now managing their family-owned



Figure 1. The Model-40D Rice Husk Gasifier Combustor.



Figure 2. The Gas Burner of the Gasifier During Actual Drying Operation.

farm in Ilocos Sur. He has a flatbed dryer with a loading capacity of 60 to 70 bags per load and dries freshly harvested paddy from 12 to 14 hours during the wet harvest season.



Figure 3. The Gasifier and the Dryer During the Training of Operator and Actual Field Testing.

The dryer is equipped with a 10-bladed, vane-axial type fan having a 0.70-m diameter and a 0.10-m width. A 7.5-hp diesel engine is used to drive the fan of the dryer at a speed of 1800 rpm. Before having the gasifier, the dryer uses a step-grate rice husk furnace as heat source which is quite difficult to operate and emits heavy smoke. Rice husk fuel is obtained from his own rice mill.

The dryer is operated by his nephew. In case of custom drying, loading of wet paddy and unloading of dried paddy are taken care of by farmers who are availing the use of the drying facility at a cost of P0.70 per kilo of wet paddy.

During the tests, 625 kilograms of wet paddy was dried using the gasifier as heat source for the flatbed dryer. The initial moisture content of the paddy was measured at



20 to 21.5% wb,

using a capacitance-type moisture

meter provided by Mr. Dagdag. The gasifier was run continuously until the paddy being dried obtained a moisture content ready for milling, i.e., 13 to 14% wb. The temperature of the drying air was determined using Type-K thermocouple wire attached to a digital thermometer. The dryer was also tested in series using 3 tons as load in actual drying condition during the wet harvest season of September to November 2016.

Results showed that the 625 kg paddy samples were dried within 5 hours and 30 minutes of continuous drying. The temperature of the air during drying ranges from 40 to 45 °C. The weight of paddy sample after drying is 552 kg. The quantity of diesel fuel consumed during drying is 2.5 liters. There are 12 sacks of rice husks, with a total weight of 87.4 kgs, consumed in drying the 625 kgs paddy using the rice husk gasifier combustor. Using the 3-ton capacity load, the dryer performs in drying the samples for 10 hours followed by 2 hours cooling. The samples are being mixed at the middle of the drying operation to obtain uniform dried paddy.

Mr. Dagdag was very satisfied with the performance of the gasifier for the reason that the machine was able to dry their paddy as per their expectation. According to them, they have observed that the gasifier does not emit smoke during operation unlike the step-grate furnace they previously used as heat source for the flatbed dryer. Mr. Dagdag said that the char, which is the by-product from gasifying rice husk in the gasifier, will be used in his farm as soil conditioner and as source of bio-fertilizer by mixing the char with swine manure. In addition, Mr. Dagdag highly recommends that the same size of the dryer with gasifier must be promoted nationwide for use by farmer's group or by a medium-size farmer to mitigate spoilage of paddy during the wet harvest season.

Figure 4. The Char Produced from the Gasifier During Drying Operation.

It is recommended that the gasifier be provided with conveyors to feed rice husk and to discharge the char to make it more operationally convenient.

For further information, contact:

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